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Phillips

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[54] **SAILBOARD STEERING ARRANGEMENT**

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[21] Appl. No.: **21,679**

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**[4] **B63H 25/02**

[52] **U.S. Cl.** **441/74;** 114/153

[58] **Field of Search** ..... 114/144 R, 152, 153, 114/162, 163, 39.2, 127, 128; 441/65–68, 74, 75

[56] **References Cited**

U.S. PATENT DOCUMENTS

166,839	8/1975	Ascough	114/153
231,017	8/1980	Davis	114/153
253,226	2/1982	Rees	114/163
2,654,335	10/1953	Ball	114/153
2,726,622	12/1955	Daniels	114/153
3,844,243	10/1974	Catoni	114/153
4,561,370	12/1985	Sanford	114/163
4,722,706	2/1988	Young	114/153
4,728,307	3/1985	Burgess	114/153
4,702,713	6/1987	Lee	114/153

FOREIGN PATENT DOCUMENTS

650922	10/1937	Fed. Rep. of Germany	114/153
194765	5/1955	Fed. Rep. of Germany	114/153

Primary Examiner—Joseph F. Peters, Jr.
Assistant Examiner—Clifford T. Bartz
Attorney, Agent, or Firm—Larson and Taylor

[57] **ABSTRACT**

A sailboard arrangement includes a board having a tail end and a forward end and a deck face and a bottom face. A steering arrangement including a foot control member pivotally mounted to the board. It has a foot engagement formation above the deck face of the board; pivotation means provided at the tail end of the board; mounting means for mounting a rudder to the pivotation means; and connection means for connecting the foot control member to the pivotation means. By operating the foot control member the angular position of the rudder relative to the board can be varied.

3 Claims, 5 Drawing Sheets

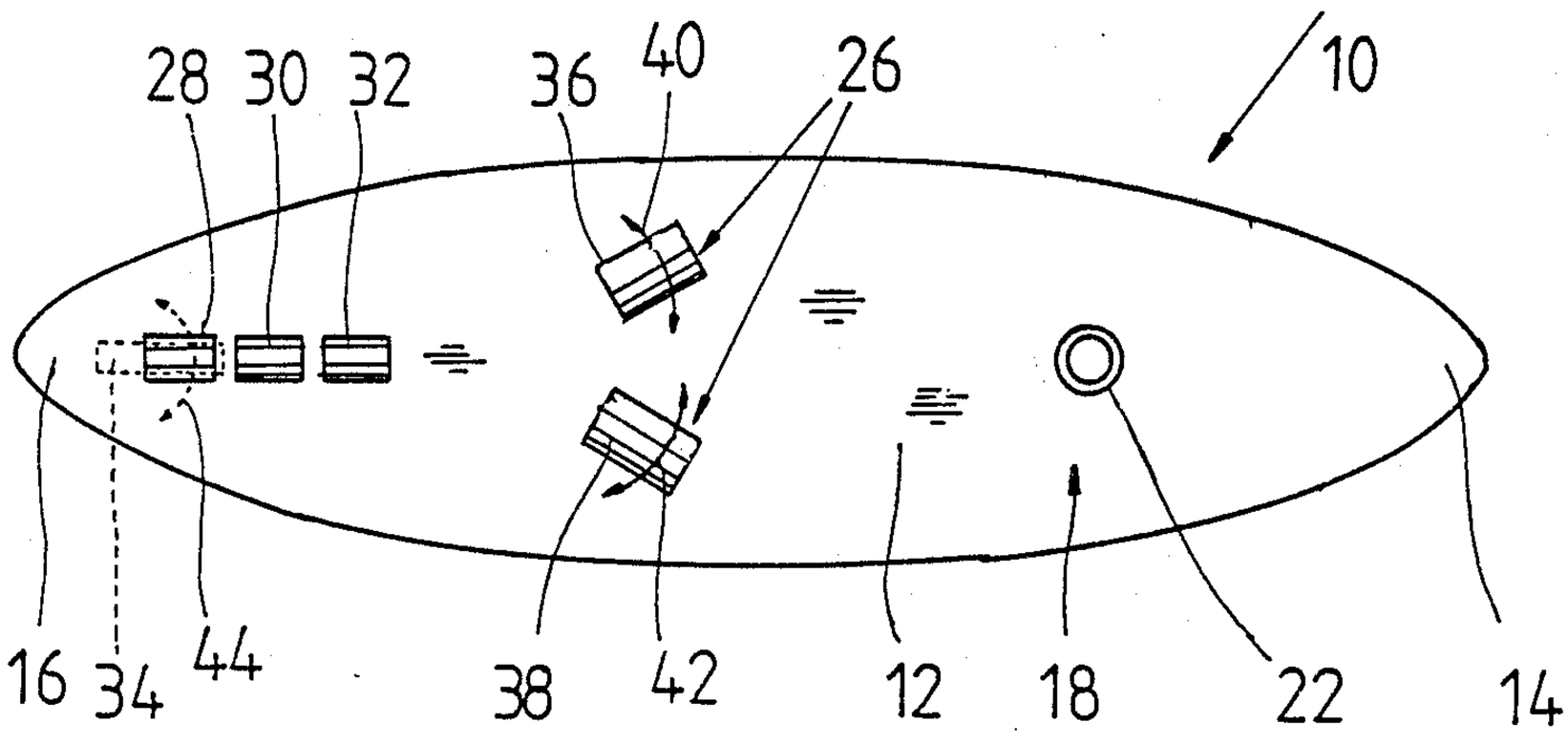

FIG. 8

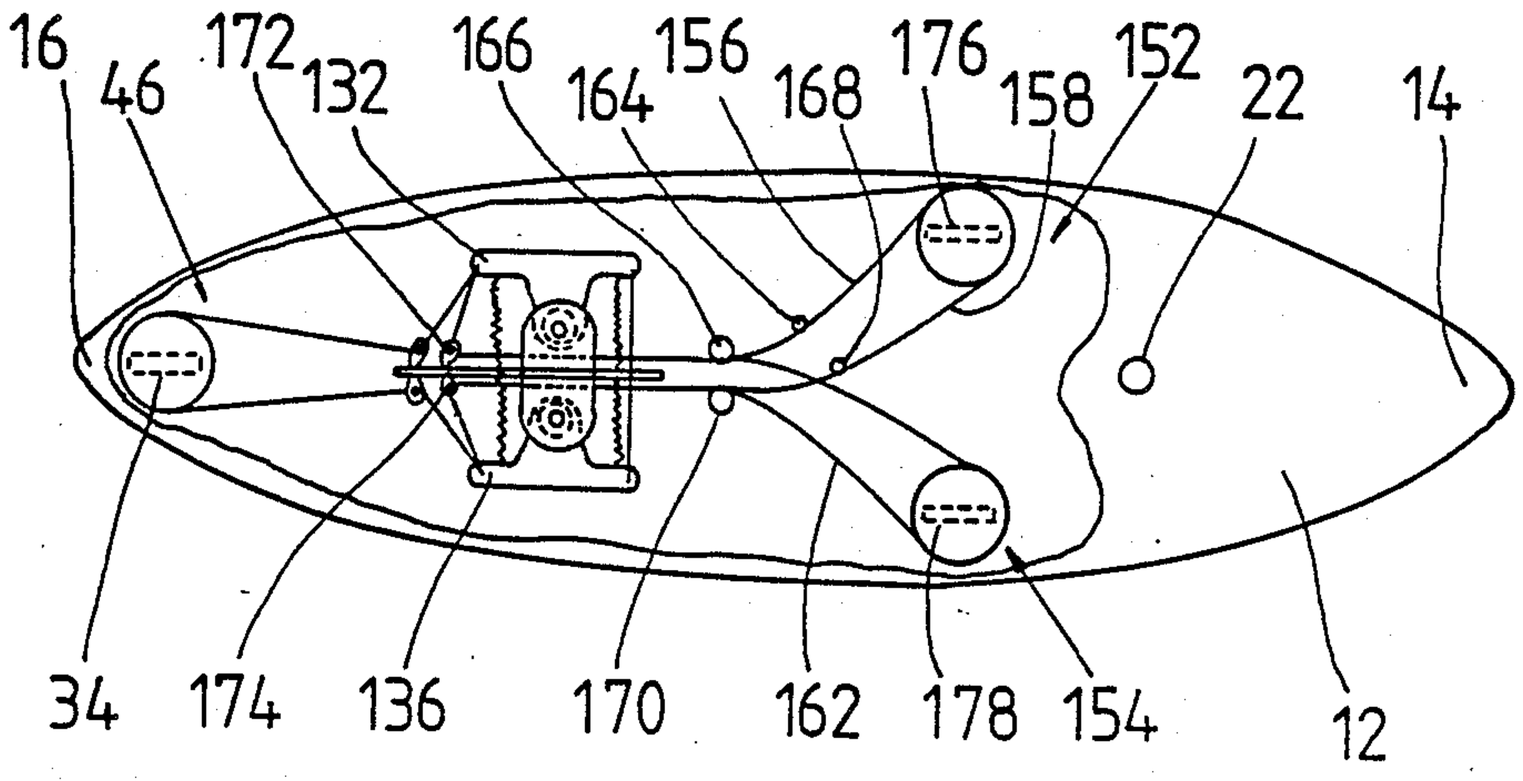
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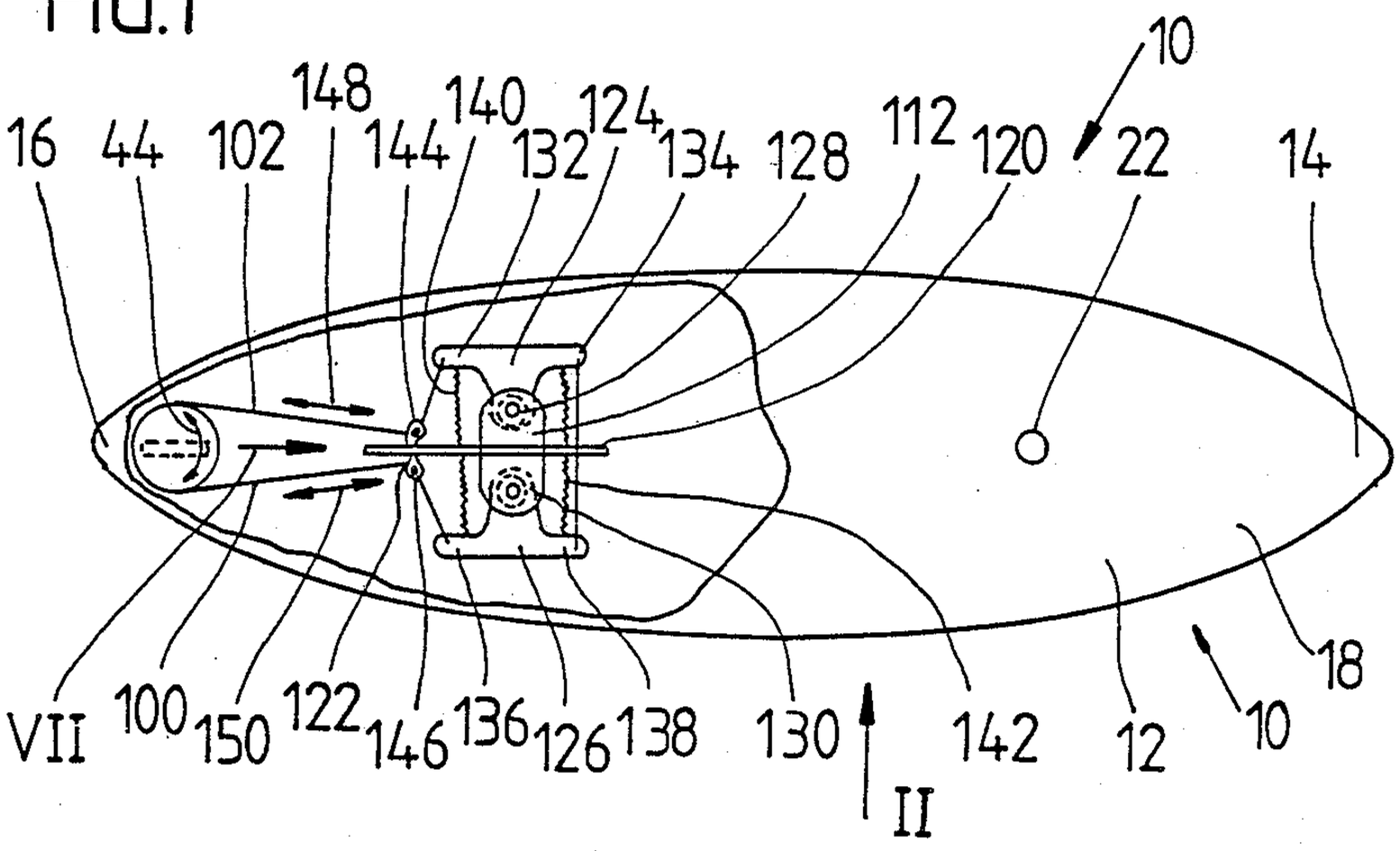
FIG.1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148
140
124
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VII
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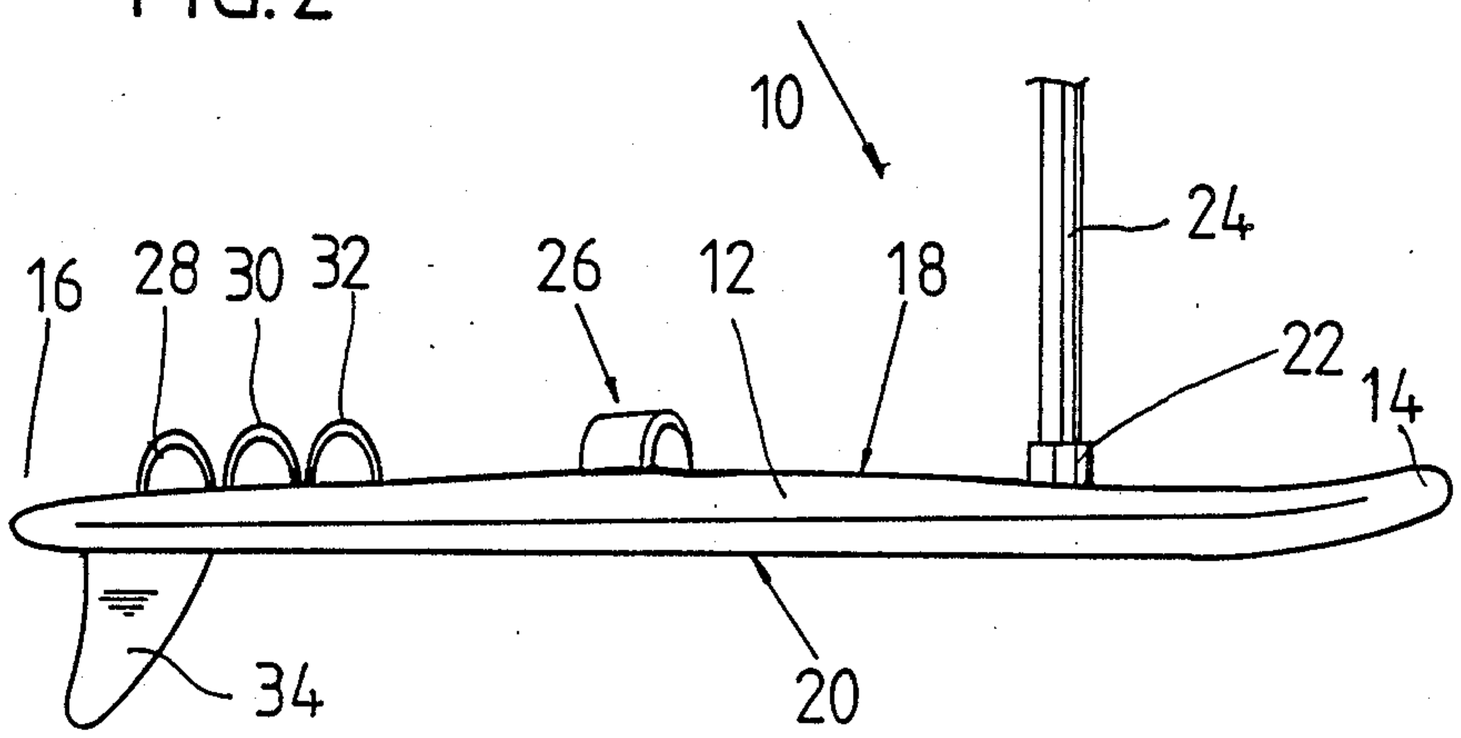
10

FIG. 2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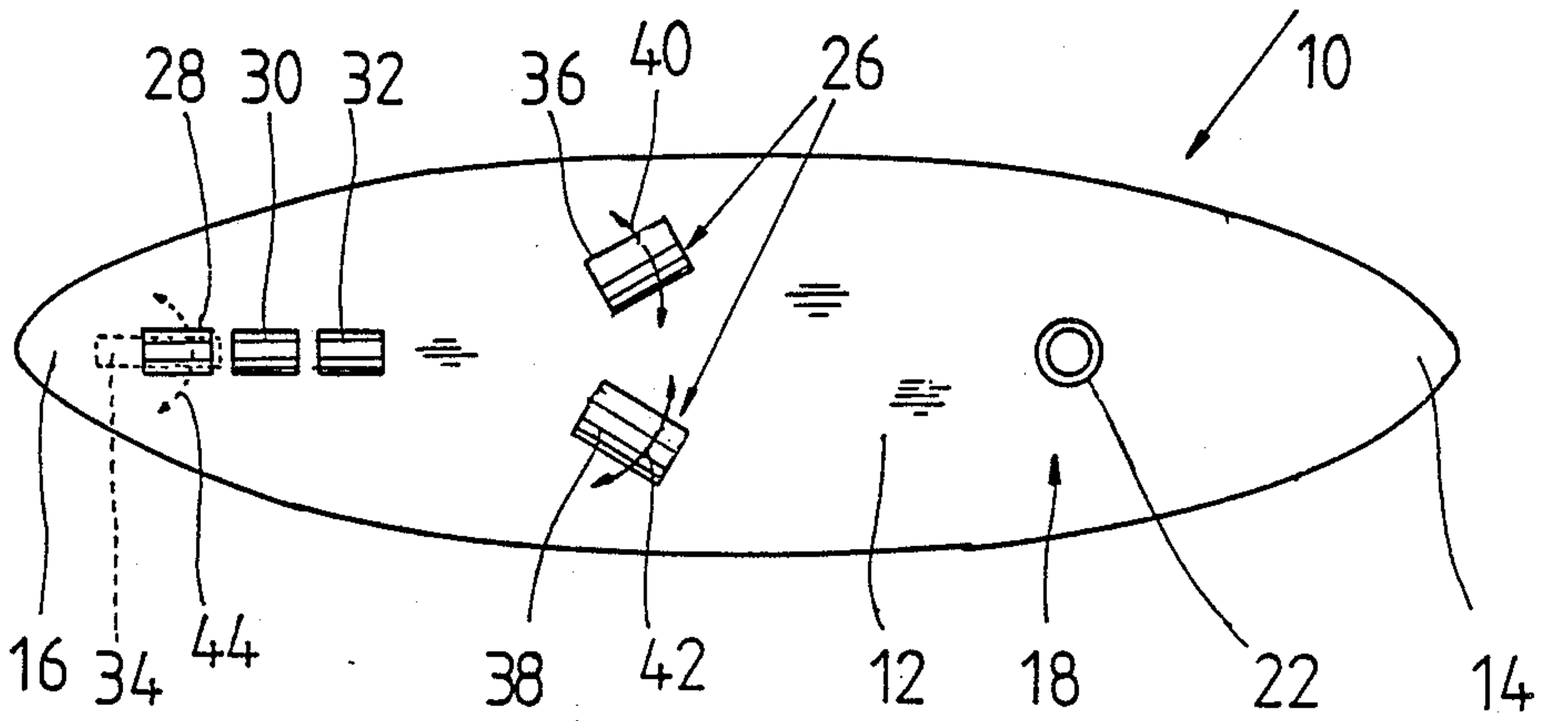
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FIG. 3

FIG.5

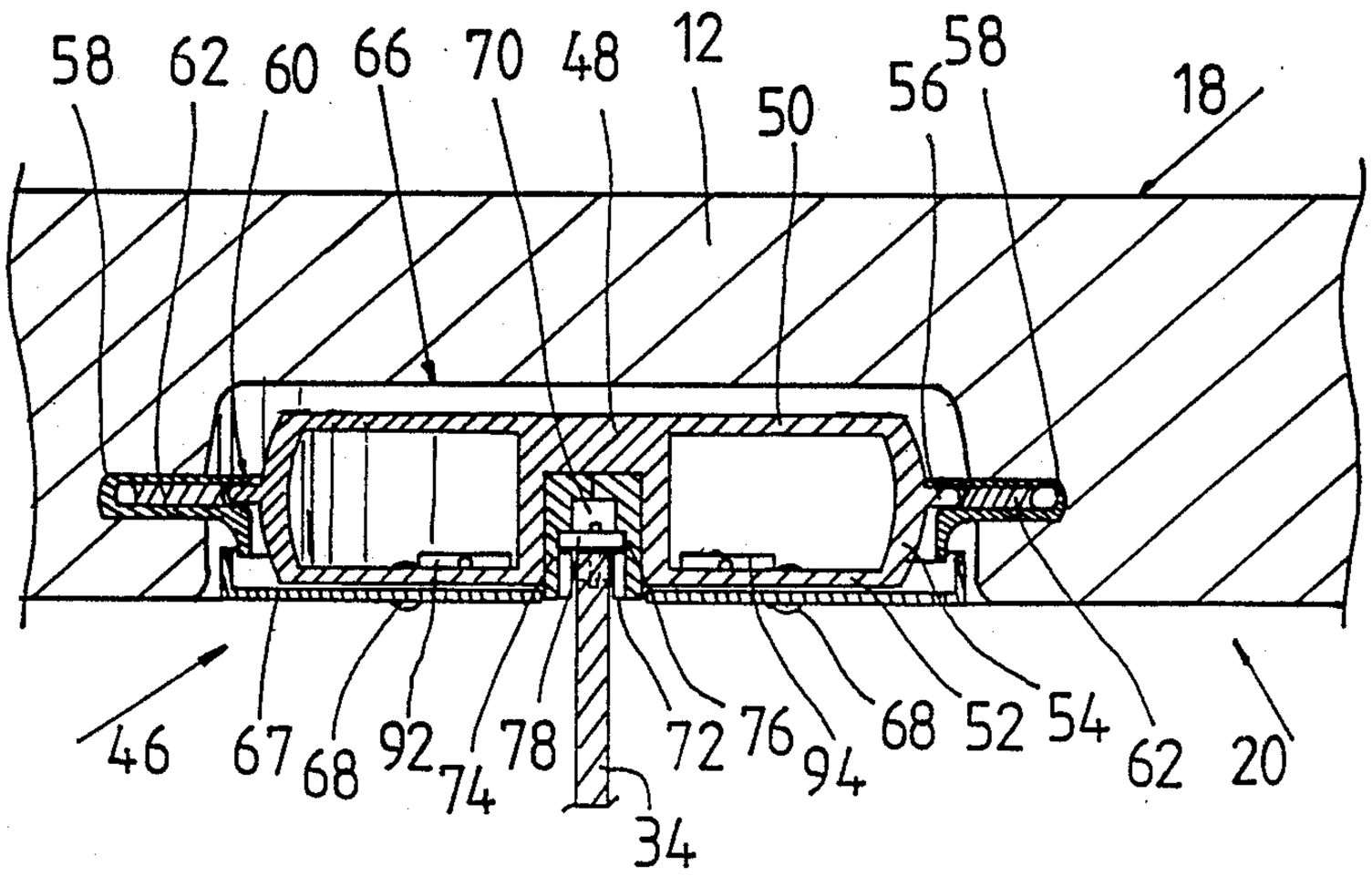
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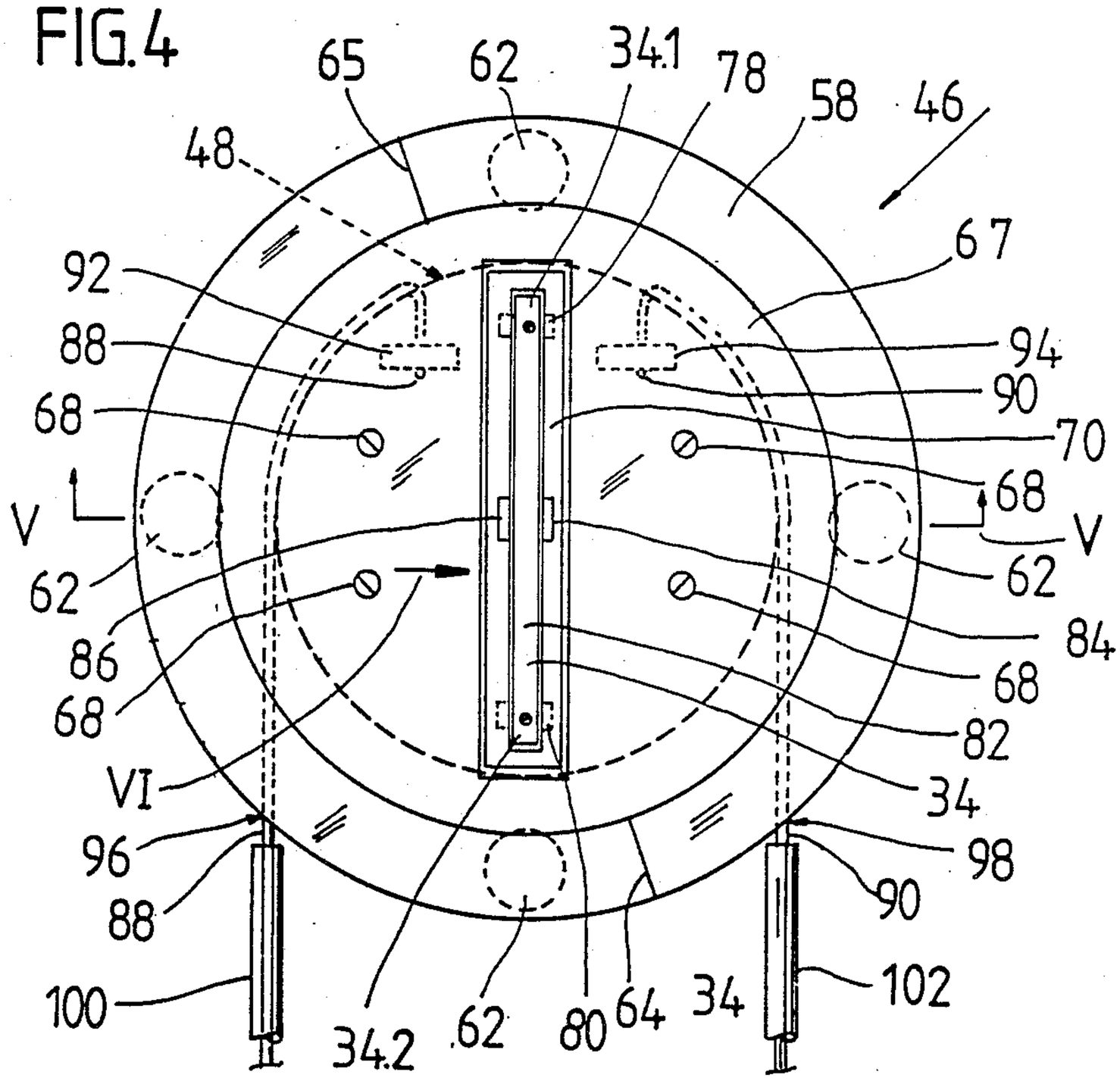
FIG.4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34.2
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FIG.6

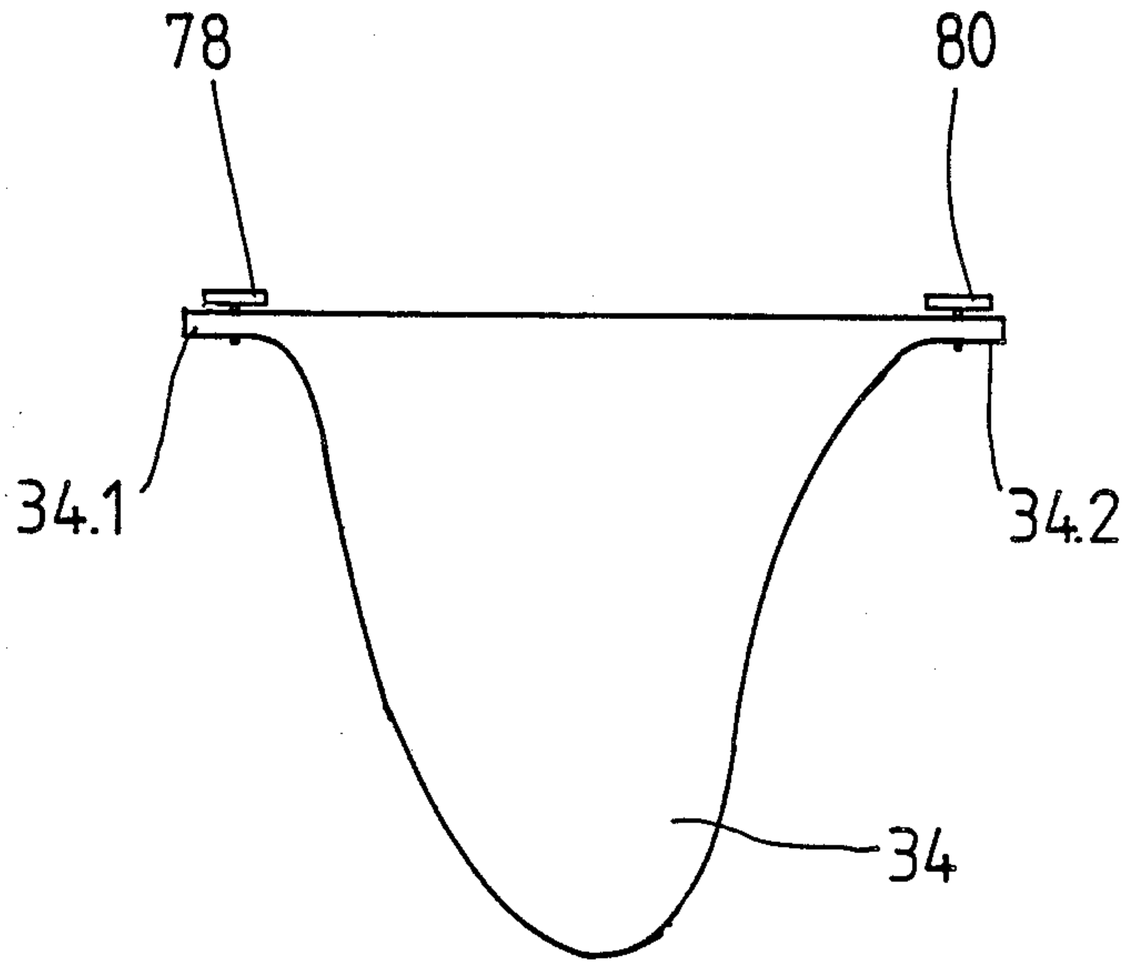
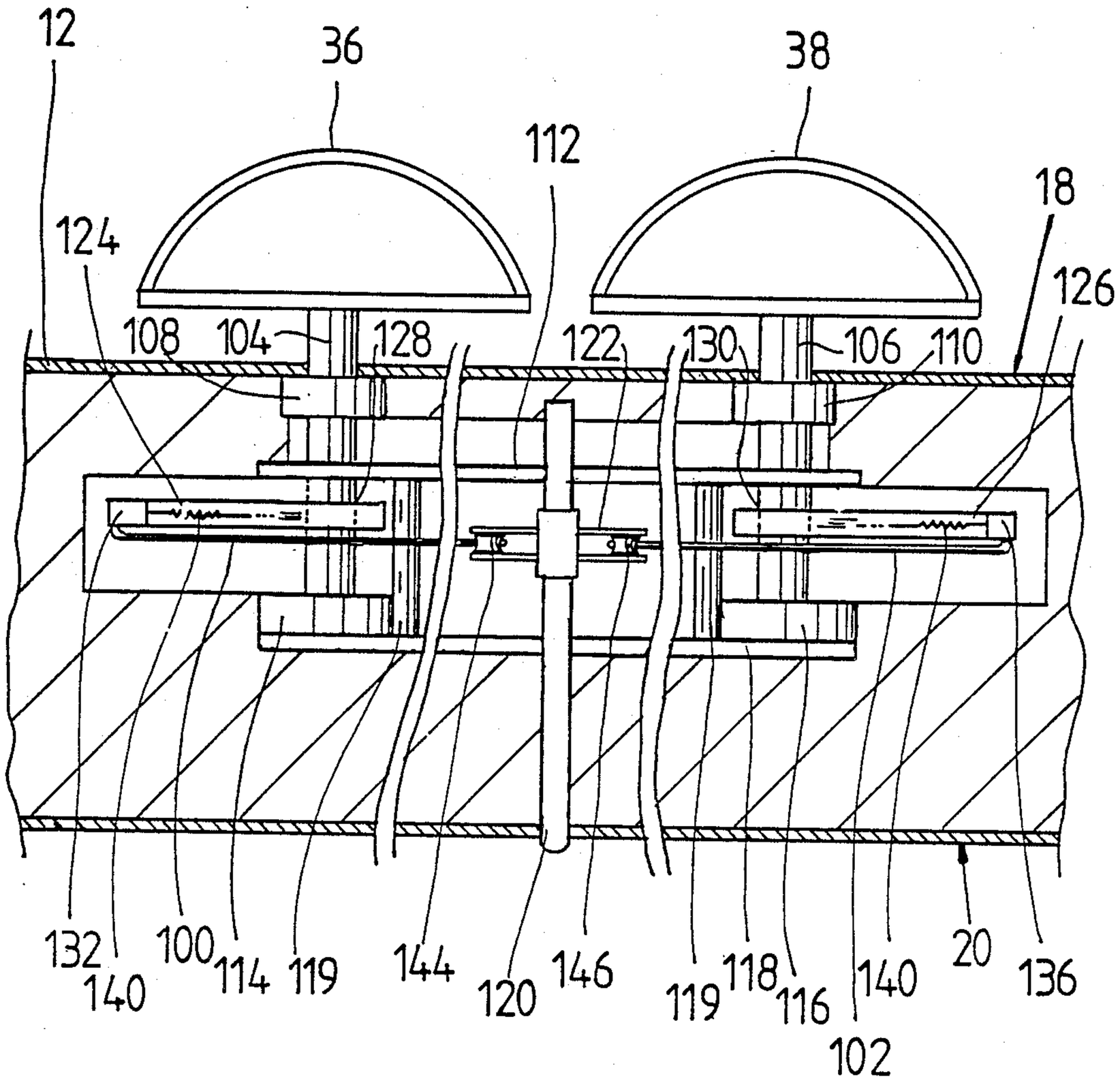


FIG.7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SAILBOARD STEERING ARRANGEMENT

FIELD OF THE INVENTION

The present invention relates to steering arrangements.

More particularly, the invention relates to steering arrangements for waterborne boards, such as sailboards.

BACKGROUND TO INVENTION

Conventional sailboards include a board with an upper or deck face or surface on which a number of foot locating stirrups or straps are provided and which has a support base for supporting the rig. On the bottom or water side of the board a fixed rudder or fin is provided.

The two hydraulic forces employed to turn a sailboard are firstly, tilting the rig to move the centre of effort of the sail to provide a turning moment in the required direction. Secondly, if the board has reasonable speed, digging a rail will increase the velocity of water flow on one side of the board inducing a lower pressure and a turning force.

When tacking or gybeing any sail powered craft, it is desirable to get the craft on the next tack with sail set as quickly as possible in order to:

a. Minimise the loss of "windage".

b. Minimise the time taken to turn.

c. To avoid the lack of control when sailing very close to the wind.

Most sail powered craft use a rudder, which deflects the water flowing past it and by Newton's second law of action and reaction, a powerful hydraulic force is employed to turn the craft. The problem with a sailboard is that with both hands on the boom, to suggest a hand held tiller is impractical.

A sailboard is used in many different conditions from smooth lake to rough sea, so an effective rudder must be controllable at speed and when the board is bouncing over choppy waves.

The vast majority of boardsailors and hence board purchasers are reasonably affluent, sail perhaps once a week for 20 weeks in a year on large (3 to 4 meter) boards on flat water. Most sailors cannot waterstart and are probably not very fit. So a sailing session is limited by the number of times they fall off and subsequently have to uphaul the sail. Most falls occur during the turn (a board with a low volume tail will perform well, but when slowed half way through a poor gybe becomes very unstable and likely to put the sailor into the water). It follows that an innovation that makes turning easier, faster and more successful can be developed can assist in overcoming the disadvantage inherent in conventional sailboards.

It is an object of the invention to suggest steering means for such rudders and also to a board including such steering means.

SUMMARY OF INVENTION

According to the invention a sailboard with steering arrangement includes

(a) a board having a longitudinal center line and a tail end, a forward end, two longitudinal sides; an upper deck face and a bottom face;

(b) at least one pair of foot control members;

(c) support means for pivotally supporting each foot control member to the board so that each foot control member of each pair is offset from the board's center line and is pivotable about a substantially vertical pivotation axis;

(d) a foot engagement formation for each foot control member above the deck face of the board;

(e) pivotation means provided at the tail end of the board;

(f) mounting means including a mounting plate for mounting a rudder to the pivotation means;

(g) connection means for operatively connecting each foot control member to the pivotation means for controlling the angular position of the rudder relative to the board by pivotation of any one of the foot control members about its vertical pivotation axis; and

(h) a sail mast support for supporting a sail mast extending from the upper deck face.

Each foot control formation may include at least one strap adapted for receiving the foot of a person standing on the board.

The sailboard may include biasing means for biasing the rudder into a neutral position, being in alignment with the longitudinal center line of the board.

BRIEF DESCRIPTION OF DRAWINGS

The invention will now be described by way of example with reference to the accompanying schematic drawings.

In the drawings there is shown in

FIG. **1** a plan view of a first embodiment of a sailboard provided with a steering arrangement in accordance with the invention and being partially cut open on the deck side to show some details of the steering arrangement;

FIG. **2** a side view of the board seen along arrow II in FIG. **1**;

FIG. **3** a plan view corresponding to FIG. **1** but not showing any details of the steering arrangement;

FIG. **4** on a larger scale, a view from below on the rudder control mechanism of the steering arrangement in accordance with the invention;

FIG. **5** a sectional side view seen along arrow V—V in FIG. **4**;

FIG. **6** a side view of the rudder only seen along arrow VI in FIG. **4** and showing its connection to the support plates;

FIG. **7** also on a larger scale, a sectional front view of the foot control arrangement of the steering arrangement in accordance with the invention and seen along arrow VII in FIG. **1**; and

FIG. **8** a plan view of a second embodiment of a sailboard provided with a steering arrangement in accordance with the invention, and being partially cut open on the deck side to show some details of the steering arrangement.

DETAILED DESCRIPTION OF DRAWINGS

Referring to FIGS. **1** to **3**, the sailboard, generally indicated by reference numeral **10**, includes a board **12** having a nose or forward end **14** and a rear or tail end **16**. The board has an upper or deck face **18** and a bottom or water face **20**.

On the upper face **18** support means **22** for a sail mast **24** is provided.

Furthermore, on the deck face **18** a pair of foot control stirrups or straps **26** are located as well as a number of rear fixedly located foot support stirrups or straps **28**, **30**, **32**.

On the bottom of the board **12**, namely extending from the bottom face **20**, a rudder **34** is located.

The foot control stirrups **26** are connected by means of connection means, which will be described hereinafter, so as to be able to control the pivotation of the rudder **34** about a vertical axis.

The steering mechanism in accordance with the invention, includes the foot control stirrups or straps **26** and their associated operative parts, the rudder **34** and its associated operative parts, and the connection parts operatively connecting the foot control stirrups **26** to the rudder **34**.

As is shown in FIG. **3** the foot control **26** includes two coupled foot stirrups or straps **36, 38**, which are adapted to be rotatable about a vertical axis so as to be pivotatable in the directions indicated by reference numeral **40, 42** respectively. By suitable pivotation of the stirrup **36** or **38** the rudder **34** can be pivoted about a vertical axis as indicated by reference numeral **44**.

In use, the arrangement will be used as follows:

TACKING

In a strong wind, the sailor will have his front foot in one of the foot controls **36** or **38**. A clockwise pivotation of one of the foot controls **36, 38** will result in a corresponding pivotation of the rudder **34**. The board **12** will head up into the wind and as the nose **14** of the board **12** approaches the wind, the front foot is moved around the mast base **22** to the opposite side of the board **12**. If necessary, the rear foot of the sailor can be used to twist the front control speeding up the tack. The turn is completed by assuming sailing position on opposite tack.

GYBEING

As for a conventional sailboard, to initiate the gybe, the rear foot of the sailor is placed on the leeward rail near to the front in the foot control **36** or **38**. An anticlockwise pivotation of the foot control **36** or **38** will give a corresponding pivotation of the rudder **34**. Once the tail **16** of the board **12** has passed through the wind, the rig is flipped onto the new side, the foot is removed from the foot control **36, 38**, the rudder **34** self centres itself (as described hereafter) and the correct sailing position can be assumed on the next tack. The foot control **36** or **38** pivotates in the opposite sense to the pivotation of the board **12**, this facilitates easy removal of the foot from the strap of the foot controls **36** or **38** when assuming the sailing position on the next tack. It also reduces the risk of injury to the sailor by not placing the foot, ankle or leg at an unnatural angle.

Referring now to FIGS. **4** and **5**, the rudder steering mechanism **46** includes a rotatable rudder box **48** having an upper wall **50**, a lower wall **52** and an annular wall **54**. A circumferential bearing flange **56** extends outwardly from the annular wall **54**. The flange **56** engages into a groove or recess provided in a ring-shaped bearing ring **58**, which in cross-section is C-shaped with the open end **60** facing inwardly. The bearing ring **58** includes a number of rotatable wheels **62** for rotatably locating the rudder body **48** by engaging with the circumferential face of the flange **56**. The bearing ring **58** is constructed in split form, and is split along the lines **64, 65**, so that it can be fitted around the flange **56** before being embedded in a sailboard **12** as shown in FIG. **5**.

The flange **56** and the wheels **62** are made to a close tolerance and are lubricated so as to reduce play.

The bearing ring **58** is embedded in the board **12** during the manufacture thereof so that the rudder box **48** is located in a recess **66** in the board **12**.

At the bottom a cover plate **67** is fitted to cover the box **48** to the outside. It is screw-connected by means of screws **68** to the box wall **52**.

In the box **48** a central elongated recess for receiving a locating channel **70** with a bottom opening **72** is provided. In the side walls of the channel **72** grooves **74, 76** are provided. These grooves **74, 76** slidingly receive plates **78, 80** which are in turn attached to the rudder **34** (see FIG. **6**). In the centre the guide **70** has sidewardly projecting gaps **84, 86** where the plates **78, 80** can be inserted into prior to being moved into the respective opposite positions as shown. When in the correct positions, the rudder **34** is screw-connected at its ends **34.1, 34.2** to the plates **78, 80** as shown in FIG. **6**.

Cables **88, 90** are connected by means of clamps **92, 94** to the box **48** and extend on the outside of the box **48** through openings **96, 98** from where they are guided in tubes **100, 102** to the foot control mechanism as will be described hereinafter.

The control cables **88, 90** pull at the outer radius of the box **48** giving maximum stability. The cables **88, 90** are anchored at the rear of the box **48** in the clamps **92, 94**. These clamps **92, 94** are accessable after the board **12** is assembled by removing the cover **67** so that adjustments to the neutral line of the rudder **34** and cable tension can be made easily. By clamping the cables **88, 90** at the rear of the box **98**, the box **48** can rotate 60° or more whilst maintaining a constant lever arm. (A maximum rotation of 35°–40° either side of neutral is preferable).

The cover plate **67** helps to reduce the penetration of dirt, sand, etc. A lubricant between the box flange **56** and the bearing ring **58** reduces water penetration to a minimum and eliminates particles of sand, etc. from getting into the bearing ring **58**. The control cables **88, 90** run through close fitting sleeves **100, 102** which prevents water from getting into the control bay.

Referring now to FIGS. **1** and **7**, the foot control stirrups or straps **36, 38** are respectively mounted on shafts **104, 106**, which are located by means of bearings or bushes or seals **108, 110** in the board **12**. The shafts **104, 106** extend through a plate **112** and are located by means of bottom bearings **114, 116** respectively on a bottom plate **118**. The plates **112** and **118** are held together by bolts **119**. A centre strengthening rib or keel **120** extends in the middle of the board **12** and supports a centre support **122**. (Also refer to FIG. **1**). Two pivotal levers **124** and **126** are respectively connected at **128** and **130** to the shafts **104, 106**. The levers **124** and **126** have outer arms **132, 134** and **136, 138** respectively. These outer arms are joined by means of springs **140, 142** so that the arms **132, 134** and **136, 138** are substantially parallel in normal position. The cables **100, 102** extend over pulleys **144, 146** to be joined to the arms **136, 132** respectively.

By pivoting either foot control stirrup **36** or **38**, the other foot control **38** or **36** will automatically be pivoted together therewith. Therefore by pivoting either foot control stirrup **36** or **38** in the direction indicated by arrow **40** or **42**, the cables **100** and **102** will be moved in the directions indicated by arrows **148, 150** so as to cause a pivotational movement of the box **48** in the direction indicated by arrow **44** and thus also of the rudder **34**. Therefore by means of the foot controls **36**

or **38** the rudder **34** can be pivoted for steering the board **12** as may be required.

In the embodiment shown in FIG. **8** the same reference numerals are used as in the other drawings. However, in this case additional rudder mechanisms **152, 154** are provided. They are identical to the rudder mechanism **46** (except that the rudders are smaller than the rudder **34**) and have cables **156, 158** and **160, 162** joined via pulleys **164, 166, 168, 170** and pulleys **172** and **174** to the arms **136** and **132**. Thus by operation of the foot controls **36, 38** the rudders **176** and **178** will be pivoted in association with the rudder **34** at the back.

The shafts **104, 106** may be made of aluminium.

The foot controls may include an upper (preferably double) strap made of rubber or other slightly flexible or padded material and being connected to a foot plate of laminated fibreglass with a central steel plate embedded in it.

The return strip **140, 142** must be sufficiently strong to ensure a return of the levers **124, 126** to their normal positions when the foot pivotation force is released.

The bearings **108, 110** may also be replaced by a silicon seal.

I claim:

1. A sailboard steering arrangement which includes:

(a) a board having a longitudinal center line and a tail end, a forward end, two longitudinal sides; an upper deck face and a bottom face;

(b) at least one pair of foot control members;

(c) support means for pivotally supporting each foot control member to the board so that each foot control member of each pair is offset from the board's center line and is pivotable about a substantially vertical pivotation axis;

(d) a foot engagement formation for each foot control member above the deck face of the board;

(e) pivotation means provided at the tail end of the board, said pivotation means comprising a vertically rotatable rudder box mounted within said board;

(f) mounting means including a mounting plate for mounting a rudder to said vertically rotatable rudder box;

(g) connection means for operatively connecting each foot control member to the pivotation means for controlling the angular position of the rudder relative to the board by pivotation of any one of the foot control members about its vertical pivotation axis; and

(h) a sail mast support for supporting a sail mast extending from the upper deck face.

2. A sailboard as claimed in claim **1**, in which each foot engagement formation includes at least one strap adapted for receiving the foot of a person standing on the board.

3. A sailboard as claimed in claim **1**, which includes biasing means for biasing the rudder into a neutral position, being in alignment with the longitudinal center line of the board.

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